

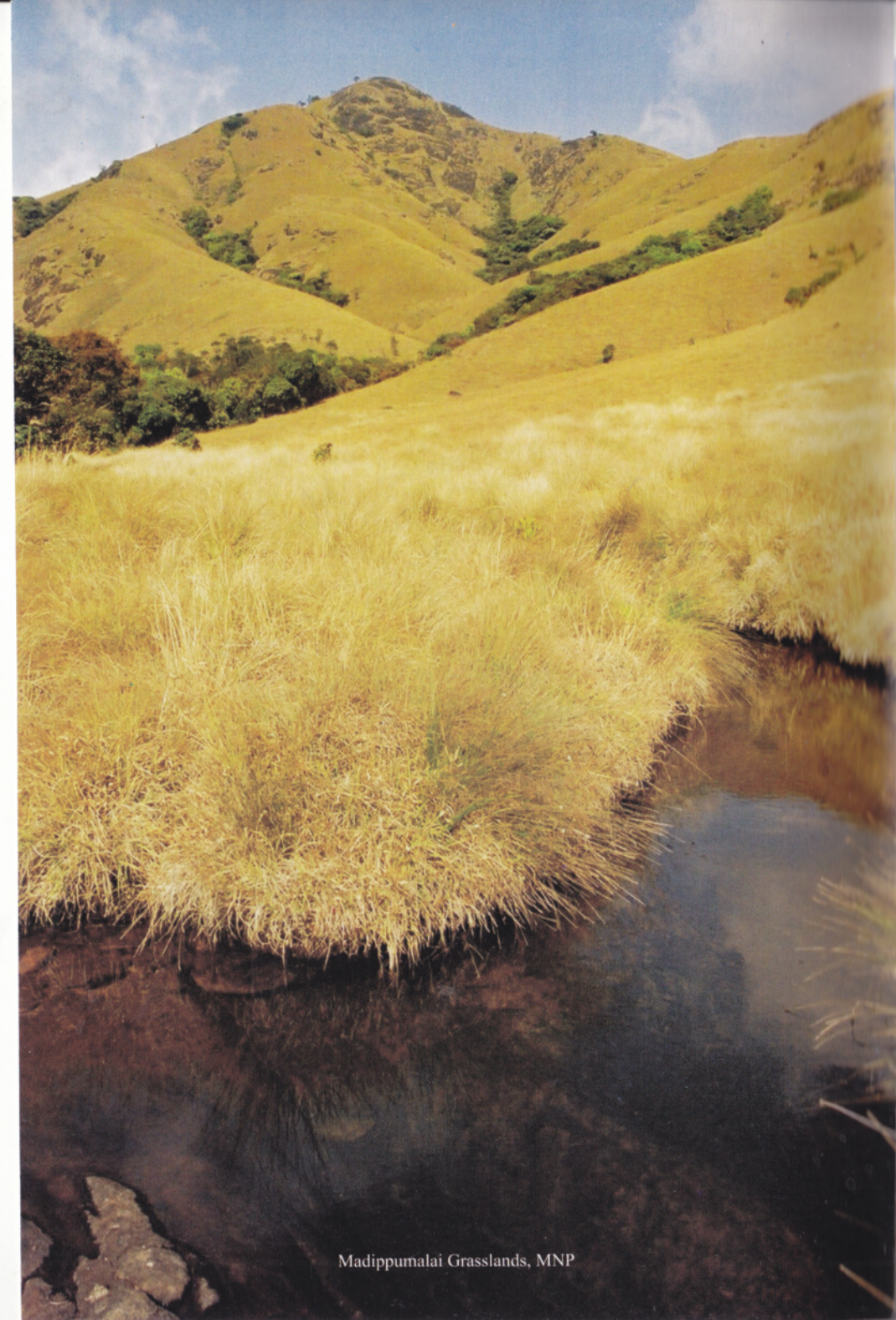
TAMIL NADU FOREST DEPARTMENT

MUKURTHI

unforeseen wilderness



*A compendium of writings and photographs
on Mukurthi National Park*

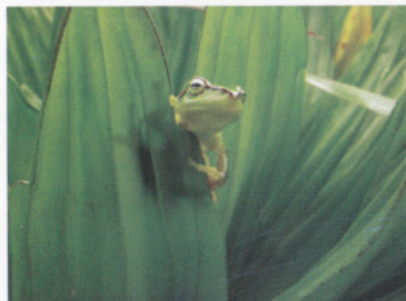


Madippumalai Grasslands, MNP

Mukurthi

unforeseen wilderness





Rhacophorus lateralis in *Hedyotis verticillaris*



Rhododendrum arboreum with Nilgiri Peak in background

Mukurthi

unforeseen wilderness

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Impatiens munronii

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Aerides ringens inside a shola in MNP



Grasslands between Nadugani and Kingerundi

About this book

This little book is about Mukurthi National Park : an area of outstanding natural beauty. It has germinated under the enthusiasm of the Park's current Wildlife Warden, Mr. Rakesh Kumar Dogra. It is a collection of photographs, notes, observations and extracts from a variety of individuals who have written about different aspects of the Upper Nilgiris. Its ambit is personal, literary, factual and scientific. In addition, *Mukurthi: unforeseen wilderness* is both an invitation and an appeal. It briefly represents the concern we share for a very special place, one that we value immensely.

Tropical montane environments are amongst the most vulnerable places today, crumbling under a slew of pressures from different quarters. Along with the Arctic tundra they are extremely sensitive to climate change. They will most likely be the first to disappear as the climate warms.

In truth, these high elevation tropical grasslands are flagship systems and hence the struggles of Mukurthi (and Eravikulam and Kudremukh) are both symbolic and real. Their decay represents the slow deaths of a million other places and their health for sure is linked to the health of all. These systems generate and sustain the waters of our survival; they are composed of a fabulous array of plant forms that turn the mountains into giant collectors of rain and mist and thus into the fountainheads of many of our

rivers. Since they are also greatly pleasing to our aesthetic sensibilities they offer a chance to mitigate the colliding forces of global warming, habitat degradation and wanton despoliation: the broad range of unrestrained, often senseless activities that degrade and destroy the last of our wild spaces and habitats. The urgency cannot be overemphasised : *we are running out of time.*

Mukurthi: Unforeseen Wilderness also seeks to provoke reflection - upon individual connections to landscapes, to plants and animals, to our own inherence in the wilder world of nature. In addition, it touches upon the probable extinction of all this and asks if we can do better than act from ignorance.

Anyone who walks in Mukurthi discovers a private magic: a flowing from the present into the past and the future, encompassing life, round and full, from the detail of a plant and the spoor of tiger to the vertiginous and giddy cliffsides of the Nilgiri Horst.

Conservation need not be bereft of feeling and enchantment, nor need an action plan be devoid of fierce love. A clear-headed approach benefits as much from the naturalist's description as the scientist's experiment. As forest officers, scientists and naturalists we find all these to be happily, fruitfully and even necessarily compatible. Species benefit, the land heals and so do the human heart and life.

April 2007



Panoramic view of Mukurthi Peak & grasslands

The Magic of Mukurthi

Mukurthi is enchanting, despite all its colonial travesty and contemporary contradictions. Its soft rounded upland, with edges that fall perplexingly away 1000 metres or more is exceptional in its beauty. Its vastness is both beguiling and rare: it appears to stretch unto infinity and yet you know it is a mere 78 sq km in size. You come to love that quickening in its wind and return again and again to be uplifted by its crisp clean air. It is a place where relatively few people come, but those who do, fall helplessly under its spell. This wild and graceful land, with all its invaded loveliness, its open wealds and staggering views, is surely a metaphor for the vanishing

wildernesses of our homeland, like the other grassland forest systems of the Western Ghats.

Mukurthi, as you come to know it, has the feel of a tapestry being woven with exquisite and meticulous care. There are multiple dimensions to connect, the wild present, the great spans of evolutionary time, the way plants are distributed not only here but across the entire Western Ghats. Little things are intriguing. For instance, the fact that *Alchemilla indica*, a gregarious herb forming thick mats in valley bottoms has its closest relative in the Himalayas. That, likewise, *Gentiana*, *Senecio*, *Rubus*, *Potentilla*, and *Geranium* are largely temperate genera. Or that half the scapigerous *Impatiens* species on earth can be found within the boundaries of this Park and nowhere else.

The heterogeneity of the ecosystem has to be experienced on

foot; you must explore that spur, and that ridge and that mound and that hollow. As you turn around a grassy knoll, you discover an unbelievable expanse. More angles, different perspectives. Huge spaces. Wildness incarnate, in the flesh. Woods nestled on other cliffs, facing other directions, overlooking valleys that open southwards, the Bhavani puzha tumbling way below.

There are shy, sweet, tender things here. Vulnerable beings. Rare ones. Singularly special. Lovely beyond measure. Watching you, receiving you as you weave your own singularly special way.

There are fierce things too. Large wild beasts that roam the mountain slopes. Here tiger and elephant and tahr and sambhar and laughing thrush disappear into swathes of nodding balsams. Here the wind howls through bonsai

woods, nested in wide open mounded wealds. Here horizontal and vertical planes intersect starkly. Here frost crunches crisply underfoot come winter. Here beauty flows through and around, full, unfettered and free.



Clouds and mist over the ridges of MNP



Shola tree, MNP

What exactly are shola grasslands?



View from Madippumalai, MNP

The Western Ghats are amongst the oldest mountain ranges in the Indian subcontinent, stretching from the river Tapi to the tip of the Peninsula. At higher altitudes, the montane ecosystem comprises a unique combination of grassland and forests. These stunted evergreen forests or *sholas* are found in discreet patches in a matrix of grassland, mostly in valleys and on the eastern slopes of the hills. The combination of frost and the morning sun kills the saplings on the western slopes and also ensures a sharp ecotone between shola and grassland.

At the beginning of the century, there was a wide debate regarding the origin of these grasslands. While some insisted they were anthropogenic and that the advent of man had created this

habitat by burning and grazing, others were convinced that the grasslands were natural. In recent times, studies on pollen and carbon isotopes in peat bogs (where sediments at different levels represent different time scales) have proved that grasslands were present in the Nilgiris as far back as 40,000 years ago, long before man invaded the landscape. The evidence also shows that *sholas* had probably expanded during periods of global warming and contracted when global temperatures had fallen.

The “sholas” are tropical montane evergreen forests, though trees tend to be more stunted than the lowland forests. The sholas are found in patches varying from less than a hectare to several hundred hectares and they are

surrounded by grasslands. Thus these sholas are naturally fragmented forests or terrestrial islands where aspects of island biogeography can be researched. Of course, the whole of the Upper Nilgiris could be viewed as an island and the shola-grassland of Anamalais and Palanis and the other ranges also as islands. Since these are separated from each other by lowland gaps, they would behave very much like islands. The shola-grassland vegetation type is the climax community at the higher altitudes of the Western Ghats.



Valley bottom grassland, MNP



Large shola, MNP

A short lesson in orogeny: *the birth of mountains*

From a diary: The rich swards of Mukurthi with their island forests roll away in the pearly mists to drop suddenly without any warning over vertiginous cliffs to the plains and plateaux of Kerala. To the north and west lies Wayanad, then Nilambur to the south west, and then Silent Valley and Attapadi to the south. This is a stunning country where towering edges meet quiet modulations. On a clear day we can see almost all of Mukurthi in a glance, a seemingly vast and uninhabited land. In a single sweep of your head you might gaze upon crest-lines, escarpments, deep drops, bumps and bosses, as well as

cloven and sheer faces that run for miles upon miles. There are horizontal and vertical planes intersecting dramatically at the edge of the Park, showing us in plain relief that we stand on the edge of Horst or block mountains produced by the processes of faulting and subsidence or upliftment along fracture lines.

The Nilgiris stand at 2500 m. On the other side of the Palghat Gap the Anamalai-High Range-Palni massif equals this height. Steep and high as they are, both block mountains are nevertheless fairly level at the top.

They are geologically identical to the



Plateau edge, MNP

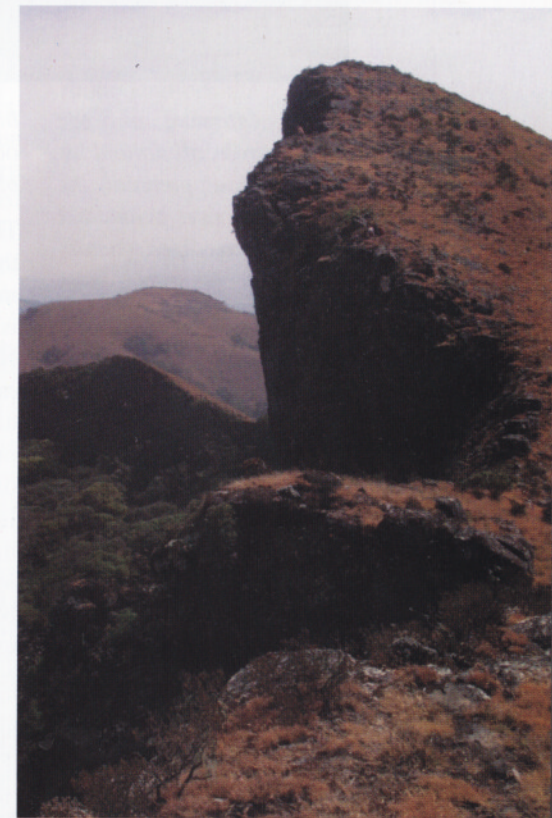
Central Mountains of Sri Lanka and are part of the mountain range that runs down the western edge of the peninsula: the Sahyadris i.e. the Western Ghats.

The Ghats are part and parcel of that great mass of solid rock that is the Deccan. This means their cores are very old, consisting mostly of metamorphic schists, charnockites and gneiss dating back to the Archaean, some 2500 million years old.

A 100 million years ago, India was part of Gondwanaland, the super-continent that included South America, Africa, Australia, Antarctica and Madagascar. Imagine this huddle of continents, clustered together in the lap of the primeval ocean, bearing our ancestral floras and faunas. Now picture this cluster breaking up and drifting apart, each jagged plate carrying a few of the plants as it slipped away. Imagine the Indian plate, a huge and triangular chunk of land, moving, sliding slowly on a 40 million year long ocean journey, to eventually dock into the soft underbelly of the gigantic Asian landmass. Imagine the earth wave that followed, heaving up the Himalayas, tilting up the Ghats, rocking and bucking the ancient Deccan peninsula over the course of several million years.

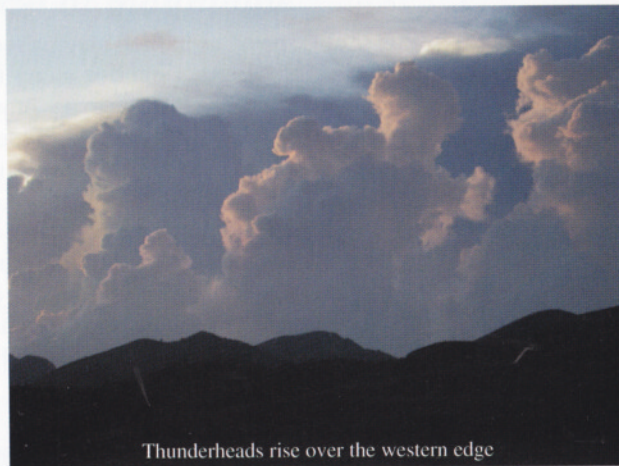
Subsidence, upliftment, collision, faulting and folding happen when the jigsaw puzzle of continental crusts rearranges itself. Continents

suffer from strains of various kinds as they move about the earth's surface. (And they move because the sea floors spread as molten magma seeps out of the Earth's interior along the ocean trenches). Plate tectonics brought India to fuse with Asia, it folded up the Tethys Sea into the Himalayas, elbowed in the Western Ghats and pushed down the Arabian Sea. It also punched up the high plateaux in the southern half of the Ghats, otherwise called the Nilgiris, the Anamalais, The High Ranges and the Palni Hills.



Mukurthi Peak

On the back of the wind: *tropical highland weather*



Thunderheads rise over the western edge

From a diary: Morning, and the clouds skim eastwards, all around us. We are on top of Madippumalai, the folded mountain that rises behind the Bangitappal rest house. Underneath, to the south, two spurs of the mountain, nose their way through the mists towards heaven. It's a special moment, as if all that remains of earth has gathered here in anticipation of this first sighting.

The western cliffs and peaks show their impressive façade. Chasms loom in the wind driven mists. Fresh on the gale of monsoon's breath, is rain that drives a sheen on grass and herb and rhododendron. It's the sea wind breathing life into paradise, inundating the fells and hollows of Mukurthi with chilled droplets of precious stinging rain.

A buzzard lifts up on the great air current, keeping watch on the windy cliffs. Then the clouds blow free,

bidding sun's lustre onto the land. The ooze of the bog, an unending trickle of sweet water, is visible way below.

The climate is harsh in this area and thus determines what lives here. For much of the year, it is wet. In fact, it is very wet. This western edge of the Nilgiris receives over 5000 mm of rainfall in a single year. Some years have recorded twice this amount of rainfall, making the slopes of Mukurthi one of the wettest spots in the world. In a single 24 hour period, upto a 1000 mm can fall. If you were out in Mukurthi on such a day, you might well believe you were in an underwater world, not high on top of a tropical mountain range.

Grasslands are not normally associated with such heavy precipitation, forests usually are. The plants that grow here have to be well adapted to this clime, this endless downpour over several

months, followed by frost, fire and a brief drought. They have to be survivors of sorts.

Winters are bright, clear and cold. Hoar frost covers the grasslands at night. The temperature drops from a balmy 25 degrees at noon to below freezing before dawn. It's like having a thin skin, you absorb heat and lose it more rapidly. The shola in contrast is a warm blooded forest, where the ground never freezes and the climate inside is maintained much more equably than the dramatic rise and fall in the grasslands. Frost followed by bright sunlight interspersed with cloud cover in a single day imposes severe stresses on plant and animal species. You can get sun burnt and frost bitten almost simultaneously. The sharp sunrays burn the leaf tissues of herbaceous species, killing them. Many species look wilted or scorched between December and February. No

young sapling of a tree species could survive this and hence the spread of shola trees into the open grassland is controlled.

The rhododendron is an exception and can withstand fire, frost and high wind velocity.

And what of the wind? Undoubtedly, it is a force to be reckoned with in itself. Walk in Mukurthi in the monsoon on the western edge and you risk being blown away. Wind velocity can be high (80-120 km an hour) and the rain drives at you horizontally and sometimes even from below! You see the sculpting effect on the rhododendrons that dare to live out in the open, away from the snug shelter of the sholas. Gnarled and twisted, with crowns flattened, boles beautifully curved over to the east. Clearly the best strategy to adopt in these parts is to *bend or else you break*.



Mist covers Mukurthi for a greater part of the year

Fresh mountain water

From a diary: *We've just entered the "temple shola" so named for the way its stones form an altar to water that tumbles down from the crest of Nadugani Mattam to carve out a hollow in the ancient rock. Grooves have been gouged out at the far end,*

leading the stream out and down. A waterfall, then a pool, and then another waterfall before it slips down towards the Bhavani. It leaves the shola and reflects the blue sky. Clouds tremble in its stony bed.



Stream flowing from the Kingerundi slopes

It's the cold chilling height of these great mountains that condenses the water out of the monsoon cumuli. The link between sea and sky, river and mountain is spelled out clearly on the slopes of Mukurthi. Every morning, rain or shine: the grassland is beaded with giant drops. The trails are dangerously slippery. The sholas are full of rushing sweet water that emerges at the bottom of each little vee to form streamlets that gather into wider streams that wind their way through the hummocky grassland. Here, in the Mukurthi grasslands, is the origin of two rivers: the Bhavani and the Pykara. The latter rises as the Mukurthi stream from the folds around the Mukurthi Peak, draining the western edge of the plateau and then plunges down steep valleys by a series of waterfalls to become the Moyar river. Both Bhavani and Moyar eventually join the Kaveri.

These high grasslands of Mukurthi with their island sholas have a unique ecology that can be best compared to a giant sponge. Drop by drop a river is generated here, one that ensures a steady supply of water to the dry plains. Mukurthi is indeed testimony to the water harvesting power of nature.

Water: the lifeblood of nature and civilisation. For this reason alone: the last wilderness areas of these southern mountains must be cherished and protected.



One of the many small waterfalls in MNP



Water collection on grass

*Moonia arnottiana*

highly endangered mountain biome. There are only two high elevation grasslands of respectable scale left in the Western Ghats: one is Mukurthi and the other is Eravikulam-Grasshills. Between them they cover some 200 square kilometres of ground. They are the final repositories of rare and threatened plant and animal species. They are also amongst the most vulnerable to climate change.

Here is a sampling of some of the rare creatures of Mukurthi:

Nilgiri tahr, which once populated the Nilgiris in huge herds of over a hundred animals, are today scarce and seen only in Mukurthi.

Of the 200 grassland plant species in Mukurthi, 80 are endemic to south India, 22 are endemic to the Nilgiris. Some plants are found only within the Park (or close to it like Avalanche, or

Sispara) and nowhere else on the planet. Some occur in gregarious dense populations, (*Alchemilla indica*, *Hedyotis verticillaris*, *Impatiens clavicornu* etc) and others as isolated individuals.

Cyathea crinita, a rare tree fern, is endemic to the Western Ghats. It is hardly to be seen in the wild anymore, only in a few pockets in the High Ranges and Palnis. Mature individuals are very uncommon. Sporeling populations can be found perhaps in three places altogether in the Western Ghats. Bangithappal is one of them.

The southwestern edge of the Nilgiri horst is richest in diversity for an unusual group of plants, the scapigerous *Impatiens*, which are unique to south India. The distribution for each species is very narrow now but was probably wider previously. They are all globally threatened species. This group is highly susceptible to any change in the environment, especially related to humidity, temperature and the presence of invasive species.

Alchemilla indica, a species with a previously wider distribution is now found only within MNP. Although gregarious and dense in its growth habits, and clearly in good health (there are three main populations within the Park), it remains to be seen how viable it is.

Hedyotis verticillaris, another narrow endemic can be seen growing

gregariously within the Park and also in fringe areas upto Avalanche. But this is the limit. This species is found nowhere else.

Mukurthi has its share of orchids too. *Eria albiflora*, *Oberonia santapau*, *Aerides ringens*, *A. crispa*, and *Coeleogyne odoratissima* can be found on the western edge. Amidst the grassclumps you will find a riot of species: *Brachycorithis iantha*, *Satyrium nepalense*, *Habenaria cephalotes*, *Seidenfia densiflora*, *Spiranthes sinensis* and *Liparis atropurpurea*.

Mukurthi is perhaps the last place for healthy populations of the Nilgiri Laughing Thrush. It is one of the 16 bird species endemic to the Western Ghats but the only one truly endemic to the Nilgiris, where its range is restricted to the higher elevation sholas.

The Horsfield's Spiny Lizard, or the Nilgiris Salea, ubiquitous throughout the Nilgiris and an endemic, is found in good numbers in Mukurthi.

Such a list of plants and animals, demonstrates



The Horseshoe Pit Viper

once again what we already know. It is a roundabout way of addressing ourselves once again to the many and pressing issues of conservation. To rephrase: *this* is what the presence of these species in such abundance in Mukurthi areas really signifies:

It signifies a particular complex of physical, climatic and evolutionary factors, without which we would not

*Cyathea crinita*

have the Impatiens or the Tahr or the Laughing Thrush in such abundance. It signifies the abundance of sweet water, both atmospheric and ground, cascading down rock slopes and vertiginous cliffs, and in deluges from the heavens. It signifies the beauty of a season, a magical monsoonal beauty, with meadows and mossy tree trunks coming alive in a blaze of colour. It signifies the fact of the monsoon itself, the cycle of dry and wet, leading to peculiar stresses on plants like the *Impatiens* whose cells mutate chromosomes faster than in most other groups, leading to the evolution of new species under our very noses. It

signifies the presence of all kinds of other beings, from butterflies and rodents, to mosses, orchids, grasses and rhododendrons.

All these species have close affinities to specific conditions. They speak volumes on the history and health of a place. Each one has a special story. In conservation jargon, they are *indicators* of the vitality of an ecosystem. They will tell you how wholesome the environment is. How viable.

The future of Mukurthi is thus tied to the future of its species. They are all ineluctably connected.



Hedysotis verticillaris and *Alchemilla indica*

Plant life in the Shola



Moss and fern covered tree inside a shola

The sholas of Mukurthi occupy sheltered folds and depressions where there is ample moisture and good drainage. The crowns of shola trees are distinctively shaped, looking like overgrown broccoli plants. They come in a variety of hues, ranging from bright shiny greens to red, pink and bronze when they flush with new leaves. Sholas typically consist of trees less than 15 metres in height, the stuntedness a result of the high wind velocities in these upper reaches. Shola trees are remarkable for their small leathery (coriaceous) leaves, evolved to withstand searing sunshine and galeforce winds. Fifty eight species of trees and shrubs have been recorded in the sholas. The common ones being: *Syzigium calophyllifolium*,

Daphiphyllum neilgherrense, *Cinnamomum wightii*, *Vaccinium leschenaultii*, *Mahonia leschenaultii*, *Litsea species*, *Lasianthes sp.* and *Psychotria* and the lovely *Michelia nilagirica*. The edges of most sholas are lined with shrubs: *Gaultheria fragrantissima* (the iodex plant), *Rhodomyrtus tomentosa*, *Rubus species*, *Rhododendron arboreum*, *Berberis tinctoria*, *Eurya nitida*. Also common are several *Strobilanthes* species and *Helichrysum species*.

Within each shola is a profusion of epiphytes on the crown branches of trees. On the ground there is a herbaceous cover which varies considerably with the soil moisture and crown cover and comprises of many

*Asiaticum calathifolium**Nothapodytes nimmoniana**Helichrysum buddleoides*

species of *Urticaceae*, *Lamiaceae*, balsams, orchids and many ferns. There are several ground orchids in the sholas, *Calanthe* being the most plentiful. You can find *Aeridis ringens*, another stunning orchid, in a few of the smaller sholas.

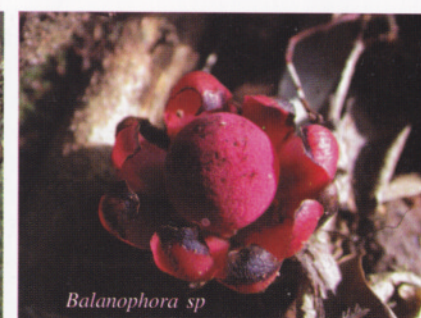
Strobilanthes kunthianus, a small shrub, blooms once in twelve years, covering the hillsides with bluish flowers, giving the Nilgiris its name (nil- blue; giri- hill). It is particularly

common along the edges of the sholas, as is *Rubus* (wild raspberry).

Sholas can vary in size from less than a hectare to a few hundred hectares. Each has one or more perennial streams running through it, and the ground is wet and covered with leaf litter. Sholas are amazing thermostats, and the temperature only varies from 15–20 °C during the same period when grasslands experience sub-zero temperatures. As a result forest life flourishes within it.

*Michelia nilagirica**Vaccinium leschenaultii*

Foliose lichen on a shola tree

*Balanophora* sp*Elaeocarpus variabilis**Sonerila* sp*Coeloglyne odoratissima**Crotalaria semperflorens*

Plant life on the grassland

The grasslands of Mukurthi are a distinctive and prominent feature of the landscape. Grasslands occur in undulating stretches, sweeping across hillsides or in patches and clumps, clustered midst rocky nooks. Specific features of grasslands vary across the region. Grasslands may be grouped into categories based on visual characteristics. The following paragraphs outline a range of descriptive categories, elaborating on significant features and species composition.

Dense grassland, tall or short, where there is no exposed ground

This kind of grassland can be quite rich to very poor in diversity, both in grasses (*Themeda tremula*, *Andropogon lividus* and *Eulalea phaeothrix*) and other herbs. There is one species of grass found on most of these areas (*Andropogon polytychus*). In some places, especially at the base of hills where it is sheltered, this particular species

grows very densely. In such areas, the grass cover is very long and dense and almost completely dominated by this one species of grass. Almost no other grasses or herbs grow there. Flat areas near streams that are not waterlogged have two other dominant species of grass (*Chrysopogon zeylanicus* and *Helictotrichon virescens*) that are also tall and dense with hardly any other plant growing among them. Such grasslands are found only in a few places covering small areas. In places where dense grass is short, there is usually a high degree of exposure to wind. These areas are diverse in grasses and other herbs.

Patchy grassland, tall or short or both together, with different degrees of exposed ground

Most of these grasslands show signs of burning. Some of these areas range from being very diverse (Nadugani), to very poor (Kingerundi area where there is a lot of exposed ground probably due to excessive burning) in plant life.

Hilltops have patchy grassland with or without evidence of fire.

The two types of grasslands namely, dense grassland and patchy grassland, have many species of plants in common. Some common examples are: *Leucas suffruticosa*, *Anaphalis wightiana*, *Andrographis lobelioides*, *Impatiens diversifolia*, *Swertia corymbosa* and *Smithia blanda*.

Shrub-dominated grassland, where different species of shrubs are dominating an area

Examples of shrubs in such places are *Strobilanthes kuntianus*, *Strobilanthes wightianus*, *Hedyotis leschenaultiana*, *Hedyotis articularis*, *Anaphalis neelgheriana*, *Helichrysum wightii*, *Helichrysum buddleoides*, *Gaultheria fragrantissima*, *Eurya nitida* and *Rhodomyrtus tomentosa*.

The most common and widespread shrubs are *Strobilanthes kunthianus*, which grows abundantly around Nadugani and Kingerundi area, and *Strobilanthes wightianus*, which is

found in most of the valleys, growing very densely along the streams.

All the other shrubs are less widespread and are not found in such large numbers. *Helichrysum wightii* is found only in a few places, and *Gaultheria fragrantissima* is found as small clumps all over the area.

Herb-dominated grassland, where different species of herbs are dominating an area

Examples of dominating herbs are: *Pteridium aquilinum*, *Hedyotis verticillaris* and *Alchemilla indica*.

The most common and widespread of these herbs is *Pteridium aquilinum* which can be seen growing in scattered clumps of different sizes, on almost all the slopes. *Hedyotis verticillaris* is found mostly on wet places in the valleys, in small clumps to large masses. *Alchemilla indica* is growing only in two places: the Bangitappal valley near the guesthouse and on the way to Nadugani near the "Labour shed."



Exacum bicolor



Dipsacus leschenaultii



Osbeckia leschenaultii



Strobilanthes gossypinus



Helichrysum wightii



Rocky grassland, where grasses and other herbs are growing on rocks or among rocks and boulders

Many of the hillsides have large rock faces sometimes covering the whole slope. They may consist of a single face or be jagged. Boulders are found clumped on top of a few hills. Some of the grasses (*Garnottia puchiparensis*, *Chrysopogon asper* and *Agrostis stolonifera*) and herbs found in rocky grassland are not found in other types of grasslands. Some examples of herbs are *Pedicularis perrottetii*, *Impatiens acaulis* and, *Leucas rosemarinifolia*. Epilithic orchids include species such as *Aerides crispa* and *Ceologyne glandulosa*.

Marshy grassland, found near streams or before the starting of streams

These are usually quite small and diverse and have some species of

plants that are special to this type of grassland such as *Impatiens rufescens*, *Parnassia wightiana*, *Senecio wightii* and *Juncus glaucus*.

Shola edge grassland

Some plants are found only along the periphery of sholas. Common examples are *Impatiens leschenaultii*, *Helichrysum buddleoides*, *Senecio intermedius* and *Rubus ellipticus*. Grasses such as *Ischaemum commutatum*, *Agrostis pilosula* and *Isachne kunthiana* are found here.

Rare species found in the area

Anaphalis leptophylla, *A. notonia*, *A. fysonii*, *Centratherum reticulatum*, *Crotalaria formosa*, *Geranium nepalense*, *Habenaria barnesii*, *Habenaria pallidiviridis*, *Hypericum hookerianum*, *Impatiens rufescens*, *Kalanchoe grandiflora*, *Pedicularis*



Drosera burmannii

Rhodomyrtus tomentosa

Strobilanthes kunthianus

perrottetii, *Picris hieracioides*, *Pimpinella leschenaultii*, *Plectranthus barbatus*, *Pogostemon atropurpureum*, *P. mollis*. *P.*

speciosus, *Senecio lawsonii*, *S. lessingianus*, *Sonerila grandiflora*, *S. rotundifolia*, *Striga lutea*, *Wahlenbergia gracilis*.



Grassland community with *Hedyotis verticillaris*, *Anaphalis neilgherense*, *Impatiens clavicornu* and *Satyrium nepalense*

The *Impatiens*



Impatiens pseudoacaulis on moss and rock

The *Impatiens* are mountain plants: orophytes. They tend to congregate in altitudes over 1000 metres. Next to the High Ranges, the Nilgiris are specially endowed with a wealth of *Impatiens*. Annual forms as well as shrubby perennial ones are to be found. The time to spot these plants is at the end of the monsoon, when the high altitude meadows ripple with a myriad nodding species: *I. acaulis*, *I. clavicornu*, *I. beddomei*, *I. modesta*, *I. rufescens* and *I. chinensis*.

In the Nilgiris alone there are some 38 *Impatiens* species. By biogeographical standards (i.e. the distribution of species in a region) that's a lot! But first, how do you recognize an *Impatiens*? And why are they called *Impatiens*?

Here are some simple and straightforward clues to the genus: Herbaceous or shrubby plants, with fleshy watery translucent stems (which occasionally become woody), prominent leaves which are also soft and membranous and usually toothed at the margins, bright irregularly shaped flowers with 3-5 petals, often spurred, and fused stamens forming a cap over the ovary. It's the springy action of the seed pod or the capsule that gives the genus its name (old folk name: Touch me not from the Latin *noli-ma-tangere*), the way it explodes on being touched, when ripe, so that the seeds may disperse widely.

Both the Nilgiris and the High Ranges have been considered as "centres of speciation" for the genus by experts, with each mountain block harbouring distinctly different groups, with each



Impatiens nilagirica



I. inconspicua and *Impatiens nepalense*



I. clavicornu

having a dozen species that are endemic to them. The Nilgiris have the highest number of scapigerous *impatiens* to be found in any one area, with only one epiphytic species found near Sispara. And the reverse holds true for the High Ranges.

Mukurthi has the highest number of scapigerous *Impatiens* found in any one place, unit area, landscape: in the world. This group is entirely endemic to the Western Ghats, half of which are found on this southwestern edge. They are very tender extremely delicate species, very vulnerable to climate change. In addition, Mukurthi itself may be a centre of speciation, i.e.

natural hybridization, a process leading eventually to the formation of new species. E.g. hybrids of *I. laticornis* and *I. lawsonii*; *I. clavicornu* and *I. pseudoacaulis* can be found.



Impatiens leschenaultii



Impatiens munronii



Impatiens nilagirica

The Himalayan connection



Rhododendron arboreum ssp. nilagiricum

Scientists have developed a scenario of the upper Nilgiris from 40000 years ago to the present day based on peat bog studies of plant pollen grains. A striking feature of Mukurthi grasslands and other high grasslands of the southern Western Ghats is their shared commonality with the Himalayas of several genera such as *Geranium*, *Justicia*, *Lilium*, *Senecio*, *Alchemilla*, *Rubus* and *Rhododendron*, usually associated with cool northern regions. Many of these are also grassland

genera and thus it is established that grasslands are at least that old from the presence of pollen grains in samples from this period.

This raises the question of how these cold dependant plants could have migrated to the distant tip of tropical peninsular India. Many theories have been expounded, but Burnhill's (1924) idea that the cold conditions of the last ice age, known as the Pleistocene, allowed plants to easily move south about 40,000 years ago is elegant in its simplicity. During that

time, the glaciers of the Himalayas extended as low as 1200 metres and the south was up to 7 degrees Celsius cooler and Mukurthi could only have experienced a very short frost free summer. The migration south would also have been facilitated by much colder conditions in the northern Satpuras and the Eastern Ghats which provide a bridge to the Nilgiris.

Blasco (1970) objected to this scenario asking, for example, why conifers, oak and birch trees had not made the

journey south. Their absence can easily be explained by the aridity of the period with cool dry air resulting from vast quantities of water locked up as ice. A recent map compiled by Dr J. Adams, "Eurasia during the last 150,000 years", shows grassland occupying India from the Peninsular and the Deccan regions right up to the Himalayas. The climate, therefore, was not favourable for trees. Another interesting feature of the Nilgiri flora is that they have in many cases evolved in isolation from their parent Himalayan populations implying that the migration occurred long enough ago for speciation to occur. *Rhododendron arboreum* ssp. *nilagirica* is a good example of this evolution at work, as is *Mahonia leschenaultii* which is very closely related to *Mahonia nepalensis* and *Berberis tinctoria* to *Berberis aristata* from central Nepal.

The evidence that a migration via a mountain bridge did occur is most convincing with regard to our mountain fauna, such as the presence of the Yellow-throated or Nilgiri Marten (*Martes gwatkinsi*). Perhaps the best example here is that of the Nilgiri Tahr (*Hemitragus hylocrius*), its shorter hair the most visible difference from its counterpart the Himalayan Tahr (*Hemitragus jemlahicus*). These mountain goats most certainly would have required a cool mountain bridge to access their present "island" like Western Ghat redoubts.



The Future:

The 80,000 year ice age abruptly began to come to an end 16,000 years ago; but then for thousands of years the climate of the Northern Hemisphere lurched back and forth between periods of ice and warmth. It is only in the last 8,000 years that humanity has bathed in the relative warmth and stability we perceive today. The vast grasslands that once covered the Indian peninsula were reforested as were the lands of Europe and north America, as the ice finally retreated. As with Mukurthi, the trees returned gradually, reintroducing themselves to the relatively sheltered valleys, forming the Shola grassland mosaic, and roughly its species composition, as we know it today.

Mukurthi presents an extraordinary paradox; its grasslands formed in the icy depths of the Pleistocene are now the product of the longest warm period the Earth has witnessed for tens of thousands of years. This really underlines how precious all the grassland fragments like Mukurthi are.

What of the future as we enter the uncharted territory of a planet warmer than we have ever known? Will the grasslands inevitably succumb to the ever pressing enhanced tropical heat that surrounds them? Perhaps not.

One thing about Mukurthi is that the very extremes of wet and cold that still prevail there, might provide a buffer in which gradual change would only shift the environment in a direction of moderation that exists in other Shola grassland eco-systems. For example if the months of heavy frost, December to March, were to decline even by 50%, the remaining two months would still perform their grassland maintenance function by destroying forest seedlings. The much drier, warmer Shola grasslands of the Palnis, provide a model showing there is a great deal of leeway for change in Mukurthi. Should however warming lead to a massive shift or decline in the monsoon the consequences would go way beyond Mukurthi National Park.



Rubus fairholmanus



Senecio sp



Mahonia leschenaultii

The life of a mountain goat



The Nilgiri Tahr (*Hemitragus hylocrius*) popularly known as Ibex or Nilgiris Ibex or *Varai aadu* in Tamil, is an outstanding example of how a conservation effort can save a species from extinction. Known to exist nowhere else in the world, the Nilgiri Tahr is endemic to the Western ghats, with only about 2500 individuals remaining in the wild now, unevenly distributed in the region. The Tahr inhabits grasslands at altitudes over 1500 metres .

The population of the Nilgiri Tahr in Mukurthi National Park is 216 animals according to the 2007 census. They prefer a niche of rocky outcrops and cliffs, and are found mostly towards the Western Catchments and Sispara,

especially areas beyond Nadugani.

Anytime you walk the Western Catchment trails along the main north south spine of the Park, you're bound to bump into the tahr. You round a corner, crest a rise, and there they sprint away: a small herd of blue grey mountain goat. Sometimes they don't move, and just stare down with those yellow sharp sighted goat eyes, implacably challenging you to move nimbly like them.

It must be fun being a mountain goat. No part of this terrain is inaccessible to you. Tahr can leap from crag to crag on precipitous cliffsides as if they were sauntering down a highway. They feed mainly on grasses, but the high Nilgiri meadows are rich with herbs which are



also good goat feed. The tahr feed on the open grass hills intermittently during the day and move towards the cliffs

for shelter from predators at night.

During the hot hours, the herd rests with a very noticeable sentinel standing guard. The Tahr herds can be seen with the kids almost throughout the year, which are produced singly and sometimes in two's, but the majority of kids are born at the onset of hot weather. The young Tahr are grey brown in colour and the males turn darker with age. The mature males are imposing in stature and a truly full grown one will sport a whitish saddle shaped patch across the shoulders and

back and hence the name: saddleback.

Mountain goats are generally handsome. The Nilgiri Tahr is plump, stocky, heavy in the shoulders, with a level back and a slightly sloping rump. The tail is unpretentious and like all ungulates, whirls a lot. But, unlike a lot of other goats, particularly its close cousin the Himalayan Tahr, the Nilgiri Tahr lacks a beard and a mane. Throat and abdomen are white. The horns for both male and female are parallel and curved backwards. The Nilgiri Tahr stands slightly taller at the shoulder (100-110 cm) than the Himalayan Tahr. The bucks are far heavier and stockier in build than the does.

The Tahr's natural predators are Panther, Tiger and Wild Dog. They face a serious threat from poaching. Mukurthi National Park accounts for just about all the Tahr in the Nilgiris today.



Out in the cold: the herpetofauna of the Upper Nilgiris

When you see the toads in the water, you know that something is amiss. Well, this is winter, in Mukurthi, where the night-time temperatures fall nearly 0°C in the open grasslands and the water remains biting cold on the sunniest days. Any sensible amphibian ought to be soaking it up while the going is good.

While many animals survive in the relatively homeostatic conditions within sholas, few have adapted successfully to the grasslands and this is particularly true of cold blooded animals such as amphibians and reptiles.

Which makes the common toad (*Bufo melanostictos*) in the Upper Nilgiris an even greater source of amazement. It occupies the open grasslands, which

is its preferred habitat there and stays active through winter, even at night. It even breeds in the cold; tadpoles abound in the streams in winter. *Bufo melanostictos* are the most common amphibians in the grassland, there are in fact not too many others. The common toad is an entirely terrestrial species and is otherwise widely distributed throughout India and Sri Lanka. It is a large toad, yellow, brown or black with darker markings, and dry warty skin. Two other species seen in these high elevations are *Bufo beddomei* and *Bufo microtympanum*, which is remarkably similar in all respects to the common toad, but is distinguished by its small tympanum.

A few good reptiles

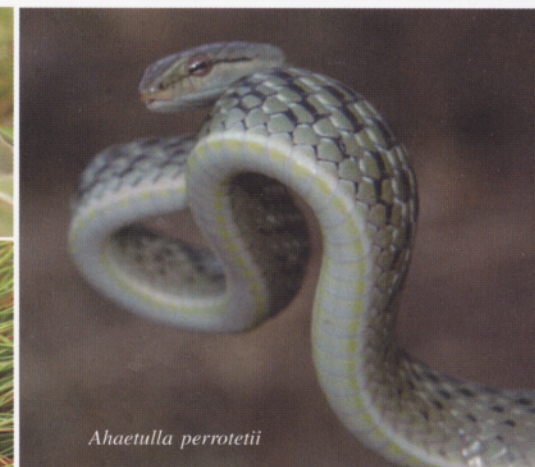
Lizards are mainly dominated by the dwarf geckos, or *Cnemaspis* spp.,



Rhacophorus pleurostictus



Bufo microtympanum



Ahaetulla perrotetii

found usually under rocks near streams. Dwarf geckos are characterised by their round pupil, their lack of calls and distinct throat and belly patterns. Also, most of them are diurnal. The Nilgiri Salea, which is endemic to the Nilgiris, and found mostly in the grasslands, shows an amazing variation in colours, from mottled brown to bright green.

Snakes are low in diversity with about 10 species; the olivaceous keelback (*Aretium schistosum*), a couple of kukris (*Oligodon taeniolatus* and *Oligodon venustus*) and of course, a handful of pit vipers, the most common one in the Nilgiris being the Horse-shoe pit viper (*Trimeresurus strigatus*). Pit vipers are generally found at higher altitudes. They are less poisonous than the other vipers such as the Russels and Saw scaled vipers, and a bite from one of these is likely to cause no more than a great deal of unpleasantness to a healthy adult. Pit vipers have a heat sensitive loreal pit on their snouts, which is a special adaptation to hunt warm blooded prey. The Bronze-headed Vine Snake: *Ahaetulla perroteti* (restricted to the Nilgiri, Anamalai and Agasthyamalai Hills), is also common in the grasslands.

Beneath the soil, above the leaves

Living one or two metres below the soil in a network of burrows, feeding on earthworms, and coming to the surface only to breed during the rainy

season are group of snakes called Uropeltids or Shieldtails. The shieldtails are a group of non-poisonous snakes, found in the Western Ghats and Sri Lanka and nowhere else in the world. There are about 45 species belonging to 7 genera, of which 35 are found in the Western Ghats. They are highly colorful snakes, and each species has its own distinct marking. The skin is superficially smooth and the scales are shiny and iridescent, showing a spectrum from blue to orange. Their wedge shaped head serves as their tunneling device, while the rough shield on the tail seems to serve for the formation of a plug to close the tunnel.

Most uropeltids live at high elevations in moist and cool areas with daily shade temperatures of 18 – 22 °C. These are burrowing snakes, living in a network of tunnels 1 – 2 feet below the surface. They feed almost exclusively on invertebrates, mainly earthworms, and are ovoviviparous, giving birth to live young. *Plectrurus perroteti*, or Perrotets shieldtail was the most common shieldtail in the Nilgiris.

Up on the trees

The amphibian community of the sholas or stunted evergreen forests is far more abundant and speciose, thanks to the moderate temperatures that are maintained within this habitat. Both mid and high elevation forests of the

Western Ghats are dominated by Rhacophorids or tree frogs. These frogs are distinguished by their enlarged toe pads and some species of *Rhacophorus* have extensive webbing on the hands and feet, which gives them increased surface area for gliding or parachuting. Rhacophorids are old world frogs and are widely distributed through Asian tropics and subtropics from India and Sri Lanka to Japan and the Philippines. Most *Rhacophorus* species build foam nests on vegetation above water. In other cases, as in a few species of the genus *Philautus*, the frogs may build foam nests on top of trees where the tadpoles drop into little pools of water which collect in tree cavities. Many species may, in fact, never descend from trees during their life cycle, breeding in the little pools of water that collect in the trunks high on the canopy. Rhacophorids have proven to be a challenge to both taxonomists and ecologists. There are many species of *Philautus* with variations in colour,

making them hard to distinguish from each other. Their habitats and life history have made them amongst the most difficult of frogs to study.

Based on current information, there are about 60 species of Rhacophorids, of which about 10 – 15 species were documented in the Upper Nilgiris. Some species of *Philautus* were marked by a striking radiating pattern on the eye. *Micrixalus opisthorhodus* inhabits the streams inside the sholas and *Rana limnocharis* in the ponds and streams. *Rana limnocharis* is considered to be part of a complex taxonomic group of very similar species. Many forest species such as *Rana nilagirica*, *Rana keralensis*, *Rana andamanensis* and *Rana mysorensis* closely resemble it, making their identification difficult. Taxonomists in fact believe that there may be more than one species within the group considered as *Rana limnocharis*. There are probably many new species of frogs awaiting discovery.



Niligiri Salea

Philautus sp.

The Nilgiri Laughing Thrush and its glee

The call is an eerie one: a cackle and laugh combined with a touch of sweet melancholy. It's lonely to the extreme. It rings out through the silent valleys and cliffs of Mukurthi, making them appear even more desolate. It's the Nilgiri Laughing Thrush crowing to an empty world, that Mukurthi is his and his alone.

If you wait long enough the cackler appears. He skulks, flaps and then skulks again, on a jamun branch, making the straggling tip bob and sway. His little profile flails against a horizon the colour of molten lava. He springs off his shola tree and then materialises on the *Rhodomyrtus* shrub and flicks his beak back full with fruit.

It has been observed that the Nilgiri Laughing Thrush likes to announce the ebbing of mist. (A useful thing to know when you get lost in the mists that so

frequently cover the slopes of Mukurthi). It has also been observed the bird bathes furtively in shallow pools in sheltered streams lined with shola trees.

The Laughing Thrush seems to always inhabit sholas rich in moss. It feeds on invertebrates, fruit, flower petals and nectar and is active mostly in the early morning and late afternoon. It feasts, like human beings, on the plentiful *Rubus* and *Rhodomyrtus* fruits of Mukurthi.

The Nilgiri Laughing Thrush breeds from February to the end of June. Its nest is a rather bulky but compact affair with a very deep cup, constructed from roots, dead leaves, small twigs, grass, lichen and moss, and is lined with fine fibres, rootlets, withered bark, fur and feathers. It lays 2-3 eggs per nest and has an incubation period of 16 days.



In the 19th century the Rufous Breasted (Nilgiri) Laughing Thrush (*Garrulax cachinnans*) was judged to be "exceedingly numerous" on the plateau, as it was one of the characteristic birds of these hills. In 1903 it was declared very common in Ooty. Now, although locally abundant, the species occupies a highly restricted range because suitable habitat has declined greatly. Between 1994 and 1997 the population density was judged to be 160-210 individuals per sqkm in undisturbed shola forests and the total breeding population was estimated to be 1800-2000. A recent study shows it is now facing local extinction in areas where it was previously common. Mukurthi National Park (and the adjacent Silent Valley National Park) is the only protected area within the entire distribution range of the species.

The Black-and-Orange Flycatcher, another species of note.

Ficedula nigrorufa, or the Black-and-Orange Flycatcher is a common resident typical of the shola habitats but has been classified as near threatened because of its habitat loss. It is usually seen sallying from boulder to bush to tree, all the while making faint calls. The call is a peculiar chrr...chrr..chrrr..and can often be heard in the shola undergrowth. It regularly visits small pools of water, rivulets and dripping rocks to bathe and drink.

The Black-and-Orange Flycatcher nests between April and July. The nests are globular, untidy, lined with the blade of *Carex baccans*, a sedge, with an entrance at or near the top. Nests are generally placed on a dead stump about one meter from the ground with little cover.

Raptors of the Edge

Come winter and you will see several species of raptors wheeling over the downs and cliffs of Mukurthi. The Common Buzzard is a regular winter visitor and soars silently and alone, above the open grasslands, occasionally making mewing calls, looking down head cocked aside. You will most likely see a Common Kestrel hovering over a spot, diving then swooping up to perch on a lone tree. It is a very common resident and seen both in the dry and wet periods. Other raptors seen in Mukurthi include: the Crested Serpent Eagle, the Marsh Harrier, the Black Eagle, the Besra, the Oriental Honey Buzzard, the Long-legged Buzzard, the Changeable Hawk-Eagle, Bonelli's Eagle, Booted Eagle, Rufous-bellied Eagle and the White-eyed Buzzard. The Peregrine Falcon and the Shikra have each been reported once in Mukurthi. Sixty years ago the Imperial Eagle was supposed to have been an occasional visitor but has not been seen in recent times. Seven sightings of the Crested Goshawk were made in 1999. A single Osprey was observed at the Upper Bhavani Dam in December 2003.

More treasures: *big and small*

A fascinating finding from a study of small mammals in the Upper Nilgiris was that the species found in forests and grasslands were markedly different. Sholas and grasslands have very sharp ecotones, which means that there is a sharp line where one habitat ends and the other begins. The small mammal community in the sholas was dominated by the white bellied forest form of the Common Rat (*Rattus rattus*). Other common species included Bonhote's Mouse (*Mus famulus*), a Shrew (*Suncus montanus*), and the Malabar Spiny Dormouse (*Platycanthomys lasiurus*), which is endemic to the Western Ghats. However, in the grassland, there was

just one rodent, the soft furred field rat or metad (*Millardia melitada*), whose presence was quite remarkable in that it has not been reported at high altitudes anywhere else, nor was it found at lower altitude forests in the Nilgiris. The Common Rat was never encountered even one metre away from the forest in the grassland, and a metad was never trapped even one metre inside the forest. Though both species were remarkably separated in the natural ecosystem, they coexisted in the plantations.

The mammals in the Nilgiris include some highly endangered species. There is the endangered Nilgiri Marten, a rarely seen animal. This is a



Sambar



P. lasiurus



Millardia melitada

small carnivore belonging to the weasel family, and its closest relative is the Himalayan Marten. Other predators in this area include Tigers, Leopards and Wild Dogs, the last being the most commonly seen. Smaller carnivores like the Jungle Cat, Leopard Cat, and the Small Indian Civet are also found in this area, but Jackals are the most abundant. Otters may be seen in some of the streams. The most common herbivore is the Sambar, though Barking Deer and Mouse Deer are also found. Black-naped hares probably form a large part of the diet for many carnivores. Elephants migrate to the upper plateau from Silent Valley and Attapadi, though there may be one or two resident herds in the upper plateau.



Suncus montanus



Nilgiri langur

Mukurthi's planted ecology:

Common weeds, exotic threats



Broom, Gorse and Wattle cover large areas

The words weed and exotic mean different things to different people. For most people, weeds are simply unwanted, unattractive plants that clog up your garden or compete with crops for nutrients and water. For biologists weeds are more importantly plants which invade pristine natural habitats having the ability to transform or destroy the integrity of ecosystem functions and services.

In everyday parlance exotic implies a tropical lushness or "having a strange or bizarre allure, beauty or quality" (Collins).

For the biologist the word has an implicitly negative ring as it often denotes a plant or animal of foreign

origin that behaves as an aggressive colonizer in its new home. The term weed and exotic are not always clearly demarcated in the mind of the botanist as they are often one and the same.

Probably the most destructive of exotic weeds found in the upper Nilgiris are trees in the genus *Acacia*, especially *Acacia mearnsii* the Black Wattle, introduced from Australia initially by the British who helped establish less than two thousand acres but by the end of 1963, 30,000 acres had been brought under Wattle on the upper Nilgiris alone. Wattle has the effect of completely extirpating the grassland ecosystem it is planted on or subsequently invades. It, together with other fast growing exotic trees such as

Eucalyptus, Pine and Cypress have not only replaced the grassland but they have sucked dry thousands of streams and marshes that once supported wildlife and provided water for local and downstream plains communities. Today Wattle remains a threat over large areas of Mukurthi National Park, especially its eastern edge.

Other exotic invasives of Mukurthi grasslands were probably introduced by the British for sentimental reasons as they were a feature of wild landscapes back home. These are Scotch Broom, *Cytisus scoparius* and the thorny Gorse, *Ulex europeus*, both in the Pea family. In the rural landscapes around Ooty they provide a colourful splash of yellow but are now a serious threat to the Mukurthi grasslands.

Many exotics, although common around the Ooty countryside, have not yet proven to be invasive of pristine landscapes. Amongst these are two "treelike" Dahlias, the more common *Dahlia tenuicaulis* (Mexico) with a slightly smaller flower and *D. imperialis* (Central America). Their huge mauve blooms provide a spectacular sight in the bright sunshine months of December and January.



Dahlia tenuicaulis



Bidens humilis



Acacia mearnsii

Dahlia tenuicaulis has been spotted in the woods around Avalanche. It could become a serious pest here if not removed.

The Mexican Sunflower, *Tithonia diversifolia* with large yellow rayed flowers, is a common feature of the wayside but not seen to be a threat as yet.

Another charming addition to Ooty's wayside flora in the Daisy family was introduced from the highlands of tropical America. This is *Bidens humilis* and was considered common by botanists even eighty years ago. A little charmer, easily identified as a typical Daisy is *Erigeron karvinskianus*, another Mexican plant commonly seen on stone walls but perhaps worryingly common along pathways and streamlets in Mukurthi where botanists hope its population has stabilized.

The Shola woodlands are, with their shady interiors, generally quite resistant to weed invasion, but are vulnerable when gaps occur in the canopy either naturally or by human disturbance. Two species in the tomato family (Solanaceae) are noteworthy. The worst of these is *Cestrum*

*Erigeron mucronatum**Cestrum auranticum**Ulex europaeus*

auranticum, from Central America, which forms dense thickets thereby preventing natural regeneration of the shola. The other, *Solanum mauritianum* or "Tree Tobacco" from Argentina can be seen commonly crowding forest borders.

Lastly it is not always the exotic that pose problems to wild habitat. We have three native species of Raspberry (*Rubus*). They normally live on the edge of the sholas enjoying the half

shade provided there, and in turn provide a thorny, protective embrace to delicate herbs that otherwise might be grazed.

Unfortunately forest plantations provide just the kind of habitat for their uncontrolled spread. When the plantation trees are felled the *Rubus* population explodes, eventually forming huge thickets. Large areas of Mukurthi are now affected in this way.



Weedy woodlands, MNP

From the chronicles

The shola grassland mosaic consists of clumps of montane forests nestled amongst undulating grassy hills. Both sholas and grasslands are rich repositories of diverse plant species. Hill communities have harvested firewood from sholas and grazed their animals in the grasslands for centuries.

onwards, whereby authorities would issue contracts to individual bidders to fell wood from identified sholas (Sutton, p.1). By this time, however, many sholas in the vicinity of the settlements had already disappeared and the conservancy measures were not adequately enforced.



Avalanche

The first indiscriminate felling of sholas came with the establishment of British settlements in Ooty, Coonoor and Wellington in the early 1800's. Sholas around these areas became the source of firewood for a growing population. Recognising the need to protect sholas, a "timber conservancy" system was established from 1841

Commissioner of the Hills, James Breeks, wrote in 1868 "...unless conservancy is taken in hand and organised under some efficient under the control of an experienced officer, the destruction of the sholas is but a question of time"

(Thyagarajan, p.70).

Around the same time that sholas were vanishing, a plantation culture was on the rise in the Nilgiris. Australian exotics were introduced between 1840 and 1856. These included four *Acacia* species: *Acacia dealbata* (silver wattle), *Acacia mollissima* (black wattle), *Acacia decurrens* (green wattle) and *Acacia melanoxylon* (blackwood), all commonly referred to as "wattle", and *Eucalyptus globulus* or "blue gum". The hope was that these plantations would meet the fuelwood and timber needs of the area. Wattle proved to have poor timber value and compared unfavourably with *Eucalyptus* as a fuelwood source. *Acacia dealbata*, with its ability to spread rapidly by root sucker, colonised vast areas and was declared a pest. It was considered "useful for covering wastelands" (T.Jeyadev, p.12). *Acacia mollissima* plantations were maintained as the bark of the tree yielded tannin for the leather industry. By the mid-1860s *Eucalyptus* was favoured over *Acacia* species as a plantation tree.

C.R. Ranganathan, Deputy Conservator of Forests (1938 to 1948), refers to a fire-protection scheme proposed in 1920 by Mr. Tireman in the Kundahs, in which the Mukurthi study area lies. Tireman felt that the protection of sholas alone was not sufficient for the area and suggested that 10-15 acre plots be "planted up each year in places where sholas have almost or quite disappeared, the most suitable species probably being *Acacia*

dealbata" (Ranganathan, p.84). Grasslands, a habitat replete with diverse species, were perceived as "wastelands", only fit to be covered with *Acacia dealbata*.

R.H. Beddome, J.S. Gamble and Dietrich Brandis, senior forest officials from the mid to late 1800s, wrote definitive volumes on Indian ferns, flora and trees. Their works continue to be the main references for plant lovers. Their vast and intimate knowledge of plant species didn't immediately translate into a plan for protecting plant habitats. Rather, in their roles as Conservators of Forests (Beddome and Gamble) and as Inspector General of Forests (Brandis) they organised the establishment and protection of plantations in shola-grassland country in the Nilgiris. Beddome was a proponent of *eucalyptus* plantations in the 1860s and 1870s. He advocated the planting of exotics in felled sholas, holding that native shola trees would take "at least a century to grow" (Sutton, p.3). In 1882, Brandis "recommended bringing present 1200 acres of plantation up to 5000 acres to create enormous forest blocks... which would make any remaining sholas redundant forest resources" (Sutton, p.6). In 1888 the Madras Govt. had protected 52 specific sholas in the Nilgiris from being used for economic gain. Gamble held that this was a "wasteful" policy and was instrumental in paring down the list to 9 sholas, all in the vicinity of the three principal

settlements (Sutton, p.8). Writing in 1903, Gamble held that a forester "has to prepare his plan of working which is to last for many years and provide for the yearly utilisation on the interest on the capital stock and the progressive improvement of the capital" (Indian Forester, Volume 29, p.494).

Unlike the conservation efforts of the present, which seek to ensure the long-term survival of the natural world,

forest conservancy measures in India from the mid-1800s onwards were born out of a "necessity for the maintenance and conservative treatment of forests" (Indian Forester, Volume 19, p.260). The priorities of forest officials lay in replacing the earlier wanton felling of forests to the "working" of forests in a systematic fashion that assured the presence of forests as a continuing economic resource.



Koondahs view near Sispara

Caring for Mukurthi: words from a Warden



Mukurthi grasslands

Mukurthi National Park, located in the south-western corner of the Nilgiri plateau, has few equals in its spectacular scenic beauty and serene nature. A tranquil paradise for many, Mukurthi is *living on the edge*. The awe-inspiring Mukurthi is too small an entity, but the wilderness it carries in a succession of smooth, rounded hills mantled with grass that rolls away into the horizon, speckled with dark, evergreen *sholas* in the folds and protected valleys is truly amazing. The long, narrow strip of the plateau along the western edges comprising the National park is 78.46 square kilometres in extent. As you go inside, you discover beautiful features

bursting into view with a breathtaking suddenness that one can only see to believe. Mukurthi was declared a Sanctuary in 1986 and subsequently as a National Park in 2001 vide G.O.Ms. No. 193, Environment and Forests (FR-V) Department, dated 12-12-2001-Notification published in the Tamil Nadu State Gazette No. 2, dated 09-01-2002.

The main objective of management in the Mukurthi National Park is to conserve the unique and endangered shola-grassland ecosystem and its endemic flora and fauna. Mukurthi National Park, is one of the few areas having a viable population of the

endangered Nilgiri Tahr (*Hemitragus hilocrius*), and has been created with a significant purpose of caring for this flagship species, protected under schedule-I of Wildlife Protection Act 1972. The area being too small, it is also imperative to identify crucial areas contiguous to the National Park for inclusion in the Park. The Department also aims to generate knowledge and information about the ecosystem through scientific studies and to sensitize the people about the values and uniqueness of the park and the emergent need for conservation.

The Forest Department has an effective anti-poaching system in place for protection in Mukurthi. This is even more important as the area is remote, has a harsh climate and difficult terrain with a long interstate

border. Not many roads exist in the National Park and most of the patrolling has to be done on foot. The anti-poaching camps have been established at Bangitappal, Nadugani, Western catchments area and near Mukurthi Fishing Hut, ensuring year round presence of our staff. The wireless network is the most effective means of communication and is the lifeline for anti-poaching operations.

Forest fire is the other significant forest protection issue. With the end of the North East monsoon in December dry conditions prevail till about April, when some pre-monsoon showers are received in this area. In the intervening period, the grasslands start drying up and the humidity in the air is low leading to onset of the fire season. Fire vulnerability is further exacerbated by



Mukurthi ranges seen from Mukurthi peak

the winter frost burning of the grass. The artificial fire breaks in the form of fire-lines and cleared trek paths are important works apart from employment of local fire watchers, at least for four months during this period, for early detection and control.

On the habitat front, one of the main problems of recent origin is the spread of exotics like *Cytisus scoparius* (Scotch Broom) and *Ulex europaea*

(Gorse) and Wattle (*Acacia sp.*), which threaten to swarm the grasslands, eliminating native grass flora. These are being removed in a phased manner with a focus to restore original biota.

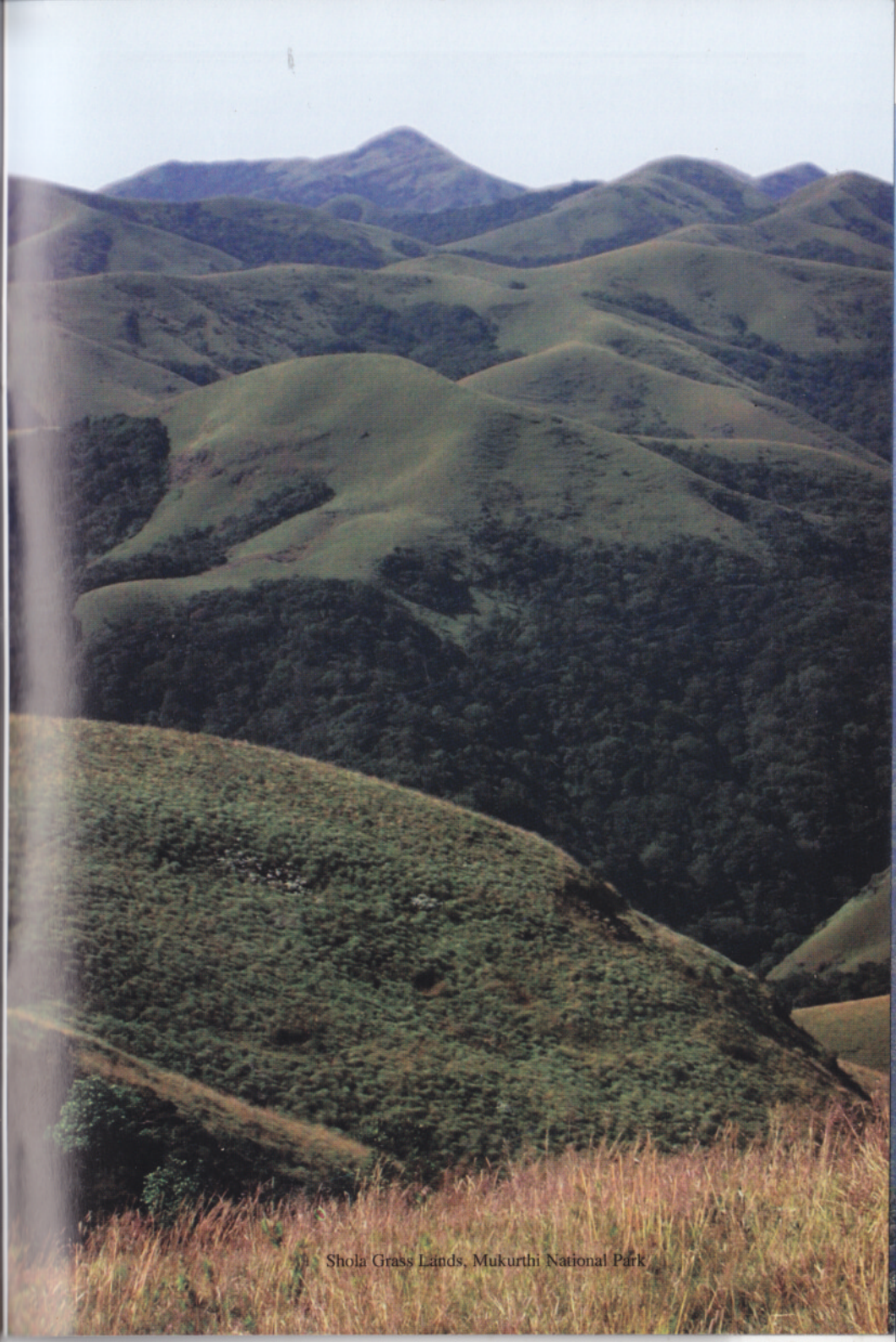
Tourism has not been the objective of management of Mukurthi, but the administration has to invariably grapple with very high tourist pressure, which threatens to degrade the crucial habitat for the Tahr. The Department

does however conduct nature awareness and conservation programme for the public and various stake-holders, controlled visits to western catchments with department personnel for education purpose including trekking expeditions through Mukurthi.

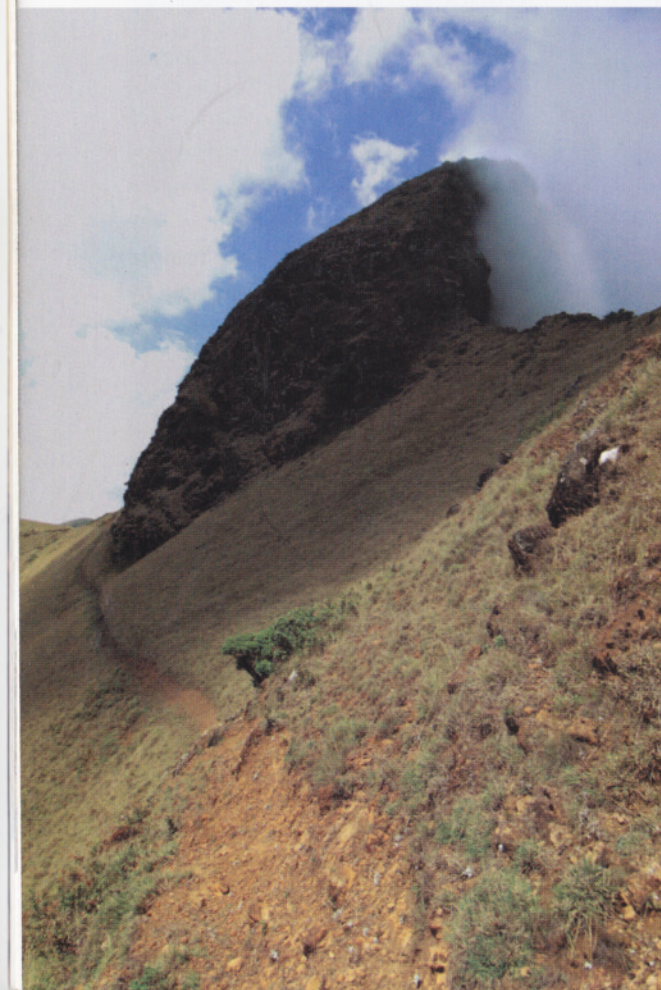
The Tamil Nadu Forest Department is sensitive to the enormous conservation values of Mukurthi, alive to its specific requirements and let us rest assured committed to preserving this tranquil paradise for posterity.

Mukurthi Peak

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Shola Grass Lands, Mukurthi National Park



References:

Ecology of Shola & Alpine Grasslands by Ashfaq Ahmad and Senthil Murugan B; BNHS 2001-02

Survey of Vegetation Diversity of Mukurthi National Park, Gurukula Botanical Sanctuary

Notes from the Edge, Suprabha Seshan

A Field Guide to Indian Mammals: Vivek Menon

Nilgiris: A Floral Paradise, article by Kartik Shanker in Sanctuary magazine

Snakes of India by Romulus Whitaker and Ashok Captain

Nilgiri Tahr: A prisoner of history. Article by Ajith Kumar in Environ magazine

Study of population and habitat suitability of the Nilgiri Laughing Thrush by Lalitha Vijayan, SACON, 2004

BirdLife International Report on Nilgiri Laughing Thrush, Black and Orange Flycatcher

The Last Generation, Fred Pearce, 2006

Forest Ecology, Phytogeography and Forest Conservation, Puri et al, 1960

Rats, An appreciation of rodent communities of the Nilgiris by Kartik Shanker, Sanctary Asia, Vol XVII No.6, Dec 1997

Frog and toad photo identification by Dr. K.V. Gururaja, CES, Bangalore

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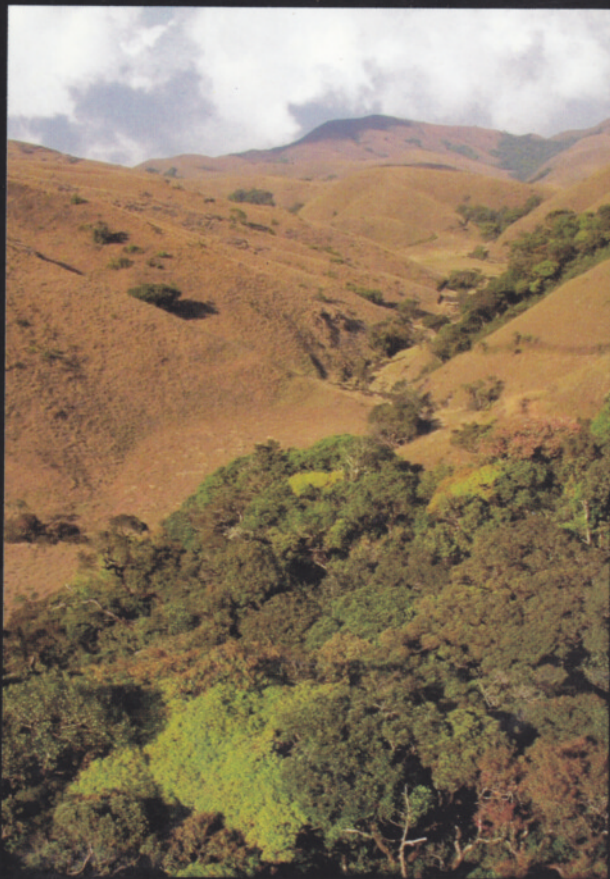
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Mukurthi peak & slopes

MUKURTHI

unforeseen wilderness



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